



Complete Summary

GUIDELINE TITLE

ACC/AHA 2002 guideline update for exercise testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing).

BIBLIOGRAPHIC SOURCE(S)

American College of Cardiology Foundation, American Heart Association. ACC/AHA guideline update for exercise testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). Bethesda (MD): American College of Cardiology Foundation; 2002. 59 p. [428 references]

COMPLETE SUMMARY CONTENT

SCOPE

METHODOLOGY - including Rating Scheme and Cost Analysis

RECOMMENDATIONS

EVIDENCE SUPPORTING THE RECOMMENDATIONS

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

CONTRAINDICATIONS

QUALIFYING STATEMENTS

IMPLEMENTATION OF THE GUIDELINE

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT

CATEGORIES

IDENTIFYING INFORMATION AND AVAILABILITY

SCOPE

DISEASE/CONDITION(S)

- Cardiovascular disease
- Obstructive coronary artery disease (CAD)
- Acute coronary syndrome (ACS) (e.g., unstable angina; acute myocardial infarction)
- Ischemic heart disease (e.g., post-coronary artery bypass graft surgery or post-percutaneous coronary intervention)
- Post-myocardial infarction
- Valvular heart disease (e.g., aortic stenosis; mitral stenosis; aortic regurgitation; mitral regurgitation)
- Exercise-induced arrhythmia
- Heart rhythm disorders (e.g., ventricular arrhythmias; supraventricular arrhythmias; sinus node dysfunction)
- Congenital heart disease

GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness
Diagnosis
Evaluation
Risk Assessment

CLINICAL SPECIALTY

Cardiology
Family Practice
Geriatrics
Internal Medicine
Sports Medicine

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

- To make recommendations regarding the appropriate use of exercise testing in the diagnosis and treatment of patients with known or suspected cardiovascular disease
- To review and revise the guidelines for exercise testing published in September 1996

TARGET POPULATION

Individuals with known or suspected cardiovascular disease

INTERVENTIONS AND PRACTICES CONSIDERED

Exercise test: cardiovascular stress test using treadmill or bicycle exercise and electrocardiographic and blood pressure monitoring

Note: Pharmacological stress and the use of imaging modalities (e.g., radionuclide imaging and echocardiography) are beyond the scope of these guidelines.

MAJOR OUTCOMES CONSIDERED

- Diagnostic characteristics and test performance (sensitivity, specificity, predictive value of an abnormal test, predictive accuracy)
- Probability of myocardial infarction
- Morbidity and mortality due to ischemic heart disease

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The committee reviewed and compiled all pertinent published reports (excluding abstracts) through a computerized search of the English-language literature since 1975 and a manual search of final articles.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

In the original 1997 guideline, the committee did not rank the available evidence. The level of evidence is provided for new recommendations appearing in the update. The weight of evidence was ranked highest (A) if the data were derived from multiple randomized clinical trials that involved large numbers of patients; and intermediate (B) if the data were derived from a limited number of randomized trials that involved small numbers of patients or from careful analyses of nonrandomized studies or observational registries. A lower rank (C) was given when expert consensus was the primary basis for the recommendation.

METHODS USED TO ANALYZE THE EVIDENCE

Meta-Analysis of Observational Trials
Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The committee conducted a systematic review with evaluation of the available clinical data and compilation of these data into evidence tables.

Meta-analysis of 147 consecutively published reports (Tables 7 through 13) involving over 24,000 patients who underwent both coronary angiography and exercise testing was used to evaluate the sensitivity and specificity of exercise testing.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Experts in the subject under consideration are selected from the American College of Cardiology and the American Heart Association to examine subject-specific data and write guidelines. The process includes additional representatives from other medical specialty groups when appropriate. Writing groups are specifically charged to perform a formal literature review, weigh the strength of evidence for or against a particular treatment or procedure, and include estimates of expected health outcomes where data exist. Patient-specific modifiers, comorbidities, and issues of patient preference that might influence the choice of particular tests or therapies are considered as well as frequency of follow-up and cost-effectiveness.

The current committee was given the task of reviewing and revising the guidelines for exercise testing published in September 1986. Since that report, many new studies have been published regarding the usefulness of exercise testing for prediction of outcome in both symptomatic and asymptomatic patients. The usefulness of oxygen consumption measurements in association with exercise testing to identify patients who are candidates for cardiac transplantation has been recognized. The usefulness and cost-effectiveness of exercise testing has been compared with more expensive imaging procedures in selected patient subsets. All of these developments are considered in these guidelines.

In considering the use of exercise testing in individual patients, the following factors are important:

- The quality, expertise, and experience of the professional and technical staff performing and interpreting the study
- The sensitivity, specificity, and accuracy of the technique
- The cost and accuracy of the technique compared with more expensive imaging procedures
- The effect of positive or negative results on clinical decision making
- The potential psychological benefits of patient reassurance

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is useful and effective.

Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/ efficacy of a procedure or treatment.

Class IIa: The weight of evidence or opinion is in favor of the procedure or treatment.

Class IIb: Usefulness/efficacy is less well established by evidence or opinion.

Class III: Conditions for which there is evidence and/or general agreement that the procedure or treatment is not useful/effective and in some cases may be harmful.

COST ANALYSIS

There are relatively few published studies comparing the cost-effectiveness of treadmill exercise testing with more expensive imaging procedures. Compared with imaging procedures such as stress echocardiography, stress single-photon emission computed tomography (SPECT) myocardial perfusion imaging, and coronary angiography, treadmill exercise testing can be performed at a much lower cost. Revised Table 3 in the original guideline is a comparison of year 2000 Medicare RVUs (relative value units, professional and technical) for treadmill exercise testing and selected imaging procedures. These RVUs provide an estimate of relative costs. Compared with the treadmill exercise test, the cost of stress echocardiography is at least 2.1 times higher, stress SPECT myocardial imaging 5.7 times higher, and coronary angiography 21.7 times higher. Lower cost of the treadmill exercise test alone does not necessarily result in a lower overall cost of patient care, because the sum of the cost of additional testing and interventions may be higher when the initial treadmill exercise test is less accurate than these more sophisticated procedures.

Treadmill exercise testing is performed frequently (see revised Table 3 in the original guideline). An estimated 72% of the treadmill exercise tests charged to Medicare in 1998 were performed as office procedures, and 27% of the charges were submitted by noncardiologists. Thus, treadmill exercise tests are more widely performed, do not always require a cardiologist, and are convenient for the patient because they are often an office-based procedure.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The document was reviewed by two outside reviewers nominated by the American College of Cardiology (ACC) and two outside reviewers nominated by the American Heart Association (AHA), as well as by outside reviewers nominated by the ACC/AHA Task Force on Practice Guidelines. The document was also reviewed and approved by the Board of Trustees of ACC and the Scientific Advisory Coordinating Committee of AHA.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Levels of recommendation (I-III) and strengths of evidence (A-C) are defined at the end of the Major Recommendation field.

Exercise Testing To Diagnose Obstructive Coronary Artery Disease (CAD)

Class I

Adult patients (including those with complete right bundle-branch block or less than 1 mm of resting ST depression) with an intermediate pretest probability of coronary artery disease (CAD) (see Table 4 in the original guideline document), on the basis of gender, age, and symptoms (specific exceptions are noted under Classes II and III below).

Class IIa

Patients with vasospastic angina.

Class IIb

1. Patients with a high pretest probability of CAD by age, symptoms, and gender.
2. Patients with a low pretest probability of CAD by age, symptoms, and gender.
3. Patients with less than 1 mm of baseline ST depression and taking digoxin.
4. Patients with electrocardiographic criteria for left ventricular hypertrophy (LVH) and less than 1 mm of baseline ST depression.

Class III

1. Patients with the following baseline electrocardiogram (ECG) abnormalities:
 - Pre-excitation (Wolff-Parkinson-White) syndrome
 - Electronically paced ventricular rhythm
 - Greater than 1 mm of resting ST depression
 - Complete left bundle-branch block
2. Patients with a documented myocardial infarction or prior coronary angiography demonstrating significant disease have an established diagnosis of CAD; however, ischemia and risk can be determined by testing (see "Risk Assessment and Prognosis in Patients with Symptoms or a Prior History of Coronary Artery Disease" and "After Myocardial Infarction" below).

Risk Assessment and Prognosis in Patients With Symptoms or a Prior History of Coronary Artery Disease

Class I

1. Patients undergoing initial evaluation with suspected or known CAD, including those with complete right bundle-branch or less than 1 mm of resting ST depression. Specific exceptions are noted below in Class IIb.
2. Patients with suspected or known CAD, previously evaluated, now presenting with significant change in clinical status.
3. Low-risk unstable angina patients (see revised Table 17 of the guideline document) 8 to 12 hours after presentation who have been free of active ischemic or heart failure symptoms. (Level of Evidence: B)
4. Intermediate-risk unstable angina patients (see revised Table 17 of the guideline document) 2 to 3 days after presentation who have been free of active ischemic or heart failure symptoms. (Level of Evidence: B)

Class IIa

Intermediate-risk unstable angina patients (see Table 17 of the guideline document) who have initial cardiac markers that are normal, a repeat ECG without significant change, and cardiac markers 6 to 12 hours after the onset of symptoms that are normal and no other evidence of ischemia during observation. (Level of Evidence: B)

Class IIb

1. Patients with the following resting ECG abnormalities:
 - Pre-excitation (Wolff-Parkinson-White) syndrome
 - Electronically paced ventricular rhythm
 - 1 mm or more of resting ST depression
 - Complete left bundle branch block or any interventricular conduction defect with a QRS duration greater than 120 ms.
2. Patients with a stable clinical course who undergo periodic monitoring to guide treatment.

Class III

1. Patients with severe comorbidity likely to limit life expectancy and/or candidacy for revascularization.
2. High-risk unstable angina patients (see Table 17 of the guideline document). (Level of Evidence: C)

After Myocardial Infarction

Class I

1. Before discharge for prognostic assessment, activity prescription, evaluation of medical therapy (submaximal at about 4 to 76 days). (Exceptions are noted under Classes IIb and III).
2. Early after discharge for prognostic assessment, activity prescription, evaluation of medical therapy, and cardiac rehabilitation if the predischARGE exercise test was not done (symptom limited; about 14 to 21 days). (Exceptions are noted under Classes IIb and III).
3. Late after discharge for prognostic assessment, activity prescription, evaluation of medical therapy, and cardiac rehabilitation if the early exercise test was submaximal (symptom limited; about 3 to 6 weeks). (Exceptions are noted under Classes IIb and III).

Class IIa

After discharge for activity counseling and/or exercise training as part of cardiac rehabilitation in patients who have undergone coronary revascularization.

Class IIb

1. Patients with the following ECG abnormalities:
 - Complete left bundle-branch block
 - Pre-excitation syndrome
 - Left ventricular hypertrophy (LVH)

- Digoxin therapy
 - Greater than 1 mm of resting ST-segment depression
 - Electronically paced ventricular rhythm
2. Periodic monitoring in patients who continue to participate in exercise training or cardiac rehabilitation.

Class III

1. Severe comorbidity likely to limit life expectancy and/or candidacy for revascularization.
2. At any time to evaluate patients with acute myocardial infarction who have uncompensated congestive heart failure, cardiac arrhythmia, or noncardiac conditions that severely limit their ability to exercise. (Level of Evidence: C).
3. Before discharge to evaluate patients who have already been selected for, or have undergone, cardiac catheterization. Although a stress test may be useful before or after catheterization to evaluate or identify ischemia in the distribution of a coronary lesion of borderline severity, stress imaging tests are recommended. (Level of Evidence: C)

Exercise Testing With Ventilatory Gas Analysis

Class I

1. Evaluation of exercise capacity and response to therapy in patients with heart failure who are being considered for heart transplantation.
2. Assistance in the differentiation of cardiac versus pulmonary limitations as a cause of exercise-induced dyspnea or impaired exercise capacity when the cause is uncertain.

Class IIa

Evaluation of exercise capacity when indicated for medical reasons in patients in whom the estimates of exercise capacity from exercise test time or work rate are unreliable.

Class IIb

1. Evaluation of the patient's response to specific therapeutic interventions in which improvement of exercise tolerance is an important goal or end point.
2. Determination of the intensity for exercise training as part of comprehensive cardiac rehabilitation.

Class III

Routine use to evaluate exercise capacity.

Special Groups: Women, Asymptomatic Individuals, and Postrevascularization Patients

Exercise Testing in Asymptomatic Persons Without Known Coronary Artery Disease

Class IIa

Evaluation of asymptomatic persons with diabetes mellitus who plan to start vigorous exercise (see page 39 of the original guideline document). (Level of Evidence: C)

Class IIb

1. Evaluation of persons with multiple risk factors as a guide to risk-reduction therapy. (Multiple risk factors are defined as hypercholesterolemia [cholesterol greater than 240 mg/dL], hypertension [systolic blood pressure greater than 140 mm Hg or diastolic blood pressure greater than 90 mm Hg], smoking, diabetes, and family history of heart attack or sudden cardiac death in a first-degree relative younger than 60 years. An alternative approach might be to select patients with a Framingham risk score consistent with at least a moderate risk of serious cardiac events within 5 years).
2. Evaluation of asymptomatic men older than 45 years and women older than 55 years:
 - Who plan to start vigorous exercise (especially if sedentary) or
 - Who are involved in occupations in which impairment might impact public safety or
 - Who are at high risk for CAD due to other diseases (e.g., peripheral vascular disease and chronic renal failure)

Class III

Routine screening of asymptomatic men or women.

Valvular Heart Disease

Class I

In chronic aortic regurgitation, assessment of functional capacity and symptomatic responses in patients with a history of equivocal symptoms.

Class IIa

1. In chronic aortic regurgitation, evaluation of symptoms and functional capacity before participation in athletic activities.
2. In chronic aortic regurgitation, prognostic assessment before aortic valve replacement in asymptomatic or minimally symptomatic patients with left ventricular dysfunction.

Class IIb

Evaluation of exercise capacity in patients with valvular heart disease. Comprehensive discussion is found in the American College of Cardiology/American Heart Association [Valvular Heart Disease guidelines](#).

Class III

Diagnosis of CAD in patients with moderate to severe valvular disease or with the following baseline ECG abnormalities:

- Pre-excitation
- Electronically paced ventricular rhythm
- Greater than 1 mm ST depression
- Complete left bundle-branch block

Exercise Testing Before and After Revascularization

Class I

1. Demonstration of ischemia before revascularization.
2. Evaluation of patients with recurrent symptoms suggesting ischemia after revascularization.

Class IIa

After discharge for activity counseling and/or exercise training as part of cardiac rehabilitation in patients who have undergone coronary revascularization.

Class IIb

1. Detection of restenosis in selected, high-risk asymptomatic patients within the first 12 months after percutaneous coronary intervention (PCI).
2. Periodic monitoring of selected, high-risk asymptomatic patients for restenosis, graft occlusion, incomplete coronary revascularization, or disease progression.

Class III

1. Localization of ischemia for determining the site of intervention.
2. Routine, periodic monitoring of asymptomatic patients after percutaneous coronary intervention or coronary artery bypass graft without specific indications.

Investigation of Heart Rhythm Disorders

Class I

1. Identification of appropriate settings in patients with rate-adaptive pacemakers.
2. Evaluation of congenital complete heart block in patients considering increased physical activity or participation in competitive sports. (Level of Evidence: C)

Class IIa

1. Evaluation of patients with known or suspected exercise-induced arrhythmias.
2. Evaluation of medical, surgical, or ablative therapy in patients with exercise-induced arrhythmias (including atrial fibrillation).

Class IIb

1. Investigation of isolated ventricular ectopic beats in middle-aged patients without other evidence of CAD.
2. Investigation of prolonged first-degree atrioventricular block or type I second-degree Wenckebach, left bundle-branch block, right bundle-branch block, or isolated ectopic beats in young patients considering participation in competitive sports. (Level of Evidence: C)

Class III

Routine investigation of isolated ectopic beats in young patients.

Pediatric Testing: Exercise Testing in Children and Adolescents

The pediatric section published as part of the original 1997 guideline will be updated at a later date and is omitted from the 2002 guideline.

Definitions:

The ACC/AHA classifications I, II, and III are used to summarize indications as follows:

Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is useful and effective.

Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.

Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy

Class IIb: Usefulness/efficacy is less well established by evidence/opinion

Class III: Conditions for which there is evidence and/or general agreement that the procedure/treatment is not useful/effective and in some cases may be harmful.

Strength of Evidence

- A. Data derived from multiple randomized clinical trials involving a large number of individuals.
- B. Data derived from a limited number of trials involving a comparatively small number of patients or from well-designed data analyses of nonrandomized studies or observational data registries.
- C. Consensus opinion of experts.

CLINICAL ALGORITHM(S)

Clinical algorithms are provided for the clinical context for exercise testing for patients with suspected ischemic heart disease and strategies for exercise test evaluation soon after myocardial infarction.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on published data from observational studies and meta-analyses, compiled by the authors in evidence tables. When few or no data exist, this is noted in the text, and the recommendations are based on the expert consensus of the committee.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Appropriate utilization of exercise testing in the clinical management of coronary artery disease and other cardiovascular conditions in adult populations
- Decreased morbidity and mortality due to ischemic heart disease resulting from assessment of functional capacity, early detection of disease, evaluation of efficacy of current medical regimen, and risk-stratification of patients according to the likelihood of subsequent cardiac events with exercise testing

Subgroups Most Likely to Benefit:

Diagnostic testing is most valuable for patients with intermediate pretest probability of coronary artery disease, because the test result has the largest potential effect on diagnostic outcome. Pretest probability of obstructive coronary artery disease is determined by the patient's age, gender and symptoms.

POTENTIAL HARMS

- Myocardial infarction and death can be expected to occur at a rate of up to 1 per 2500 tests. Nonfatal complications include, angina, ischemic ST-segment changes, hypotension or hypertension, low exercise cardiac output, syncope, ataxia, dizziness, cyanosis, pallor, sustained ventricular tachycardia, arrhythmias (multifocal premature ventricular contractions [PVCs], triplets of PVCs, supraventricular tachycardia, heart block, bradyarrhythmias), fatigue, shortness of breath, wheezing, leg cramps, claudication, bundle-branch block or intraventricular conduction delay.
- In patient populations with low pretest probability of coronary artery disease, exercise testing results may provide misleading information that could lead to inappropriate or unnecessary additional testing or therapy. Exercise testing should not be used to screen the general population because false-positive test results may engender inappropriate anxiety and may have serious adverse consequences in relation to work and insurance.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Absolute contraindications: acute myocardial infarction (within 2 days), high-risk unstable angina, uncontrolled cardiac arrhythmias causing symptoms or hemodynamic compromise, symptomatic severe aortic stenosis, uncontrolled symptomatic heart failure, acute pulmonary embolus or pulmonary infarction, acute myocarditis or pericarditis, acute aortic dissection.
- Relative contraindications: left main coronary stenosis, moderate stenotic valvular heart disease, electrolyte abnormalities, severe arterial hypertension, tachyarrhythmias or bradyarrhythmias, hypertrophic cardiomyopathy and other forms of outflow tract obstruction, mental or physical impairment leading to inability to exercise adequately, high degree atrioventricular block.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- These guidelines attempt to define practices that meet the needs of most patients in most circumstances. The ultimate judgement regarding care of a particular patient must be made by the physician and patient in light of all the circumstances presented by that patient.
- Left ventricular hypertrophy, resting ST depression and possibly digoxin appear to lower the specificity of exercise testing. However the meta-analyses on which this conclusion is based assume that the study populations were otherwise equal with respect to characteristics that might influence test performance. This critical assumption has not been confirmed and may not be true. The wide variability in test performance apparent from these meta-analyses can be explained by differing degrees of workup bias, but it also demonstrates that some of the variability is explained by improper methods for testing and analysis.
- The clinical diagnosis of coronary artery disease (CAD) in women presents difficulties that are not encountered in the investigation of men. Physicians must be cognizant of the influence of submaximal exercise on sensitivity; patients likely to exercise submaximally should be considered for pharmacological stress testing. The optimal strategy for circumventing false-positive test results for diagnosis of CAD in women remains to be defined; however, there are currently insufficient data to justify routine stress imaging tests as the initial test for CAD in women.
- Because the exercise test is a diagnostic tool rather than a therapy, its effect on patient outcomes is necessarily indirect. No randomized trials of exercise testing versus no exercise testing have been performed. No direct evidence links different exercise testing strategies with differing outcomes.
- One important issue that has received inadequate study is the relative value of exercise testing for predicting future cardiac deaths versus future myocardial infarctions (fatal or nonfatal).
- Few data have been published with respect to the use of exercise testing for diagnostic and prognostic assessment of CAD in patients older than 75 years. Although angiographic tables show an increased gradient of risk for coronary disease and more extensive coronary disease in older patients, there are few

data from patients older than 75 years. The performance of exercise testing poses several problems in the elderly, but it is certainly not contraindicated in this group. (The problems are discussed in detail in the text.)

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American College of Cardiology Foundation, American Heart Association. ACC/AHA guideline update for exercise testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). Bethesda (MD): American College of Cardiology Foundation; 2002. 59 p. [428 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1997 Jul (revised 2002 Sep)

GUIDELINE DEVELOPER(S)

American College of Cardiology Foundation - Medical Specialty Society
American Heart Association - Professional Association

SOURCE(S) OF FUNDING

American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA). No outside funding is accepted.

GUIDELINE COMMITTEE

Committee to Update the 1997 Exercise Testing Guidelines

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Committee Members: Raymond J. Gibbons, MD, FACC, FAHA (Chair); Gary J. Balady, MD, FACC, FAHA; J. Timothy Bricker, MD, FACC; Bernard R. Chaitman, MD, FACC, FAHA; Gerald F. Fletcher, MD, FACC, FAHA; Victor F. Froelicher, MD, FACC, FAHA; Daniel B. Mark, MD, MPH, FACC, FAHA; Ben D. McCallister, MD, FACC, FAHA; Aryan N. Mooss, MBBS, FACC, FAHA; Michael G. O'Reilly, MD, FACC; William L. Winters, Jr., MD, FACC, FAHA

Task Force Members: Raymond J. Gibbons, MD, FACC, FAHA (Chair); Elliott M. Antman, MD, FACC, FAHA (Vice Chair); Joseph S. Alpert, MD, FACC, FAHA; David P. Faxon, MD, FACC, FAHA; Valentin Fuster, MD, PhD, FACC, FAHA; Gabriel Gregoratos, MD, FACC, FAHA; Loren F. Hiratzka, MD, FACC, FAHA; Alice K. Jacobs, MD, FACC, FAHA; Richard O. Russell, MD, FACC, FAHA*; Sidney C. Smith, Jr., MD, FACC, FAHA

* Former Task Force member during this writing effort.

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

The American College of Cardiology/American Heart Association (ACC/AHA) Task Force on Practice Guidelines makes every effort to avoid any actual or potential conflicts of interest that might arise as a result of an outside relationship or personal interest of a member of the writing panel. Specifically, all members of the writing panel are asked to provide disclosure statements of all such relationships that might be perceived as real or potential conflicts of interest. These statements are reviewed by the parent task force, reported orally to all members of the writing panel at the first meeting, and updated yearly and as changes occur.

ENDORSER(S)

American College of Sports Medicine - Medical Specialty Society
American Society of Echocardiography - Professional Association
American Society of Nuclear Cardiology - Professional Association

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previously released version: Gibbons RJ, Balady GJ, Beasley JW, Bricker JT, Duvernoy WF, Froelicher VF, Mark DB, Marwick TH, McCallister BD, Thompson PD Jr, Winters WL, Yanowitz FG, Ritchie JL, Gibbons RJ, Cheitlin MD, Eagle KA, Gardner TJ, Garson A Jr, Lewis RP, O'Rourke RA, Ryan TJ.

ACC/AHA guidelines for exercise testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). J Am Coll Cardiol 1997 Jul; 30(1):260-311.

These guidelines will be reviewed 1 year after publication and yearly thereafter and considered current unless the Task Force on Practice Guidelines revises or withdraws them from circulation.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American College of Cardiology Web site:

- [HTML Format](#)
- [Portable Document Format \(PDF\)](#)

Print copies: Single copies available from the American College of Cardiology, Resource Center, 9111 Old Georgetown Rd., Bethesda, MD 20814-1699; (800) 253-4636 (US only). Bulk reprints available from AHA, Public Information, 7272 Greenville Ave., Dallas TX 75231-4596; Reprint No. 71-0231.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- ACC/AHA 2002 guideline update for exercise testing: summary article. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1997 Exercise Testing Guidelines). Circulation. 2002; 106:1883-92.

Electronic copies: Available from the American College of Cardiology (ACC) Web site in: [HTML Format](#) and [Portable Document Format \(PDF\)](#).

Print copies: Single copies available from the American College of Cardiology, Resource Center, 9111 Old Georgetown Rd., Bethesda, MD 20814-1699; (800) 253-4636 (US only). Bulk reprints available from AHA, Public Information, 7272 Greenville Ave., Dallas TX 75231-4596; Reprint No. 71-0232.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on June 30, 1998. The information was verified by the guideline developer on December 1, 1998. This summary was updated by ECRI on January 9, 2003. The information was verified by the guideline developer on June 16, 2003.

COPYRIGHT STATEMENT

This NGC summary is based on the original guideline, which is subject to the guideline developer's copyright restrictions as follows:

Copyright to the original guideline is owned by the American College of Cardiology Foundation (ACCF) and the American Heart Association, Inc. (AHA). NGC users are free to download a single copy for personal use. Reproduction without permission of the ACC/AHA guidelines is prohibited. Permissions requests should be directed to Lisa Bradfield, 9111 Old Georgetown Rd, Bethesda, MD 20814-1699; telephone, (301) 493-2362; fax, (301) 897-9745.

© 1998-2004 National Guideline Clearinghouse

Date Modified: 11/15/2004

The logo for FIRST GOV, with "FIRST" in blue and "GOV" in red, and a small American flag graphic above the text.

